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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/941,048	08/28/2001	Takeshi Nishi	SEL 274	5731

7590

05/03/2006

COOK, ALEX, McFARRON, MANZO,
CUMMINGS & MEHLER, LTD.
SUITE 2850
200 WEST ADAMS STREET
CHICAGO, IL 60606

EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT	PAPER NUMBER
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1774

DATE MAILED: 05/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/941,048

Applicant(s)

NISHI ET AL.

Examiner

Marie R. Yamnitzky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-12 and 14-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-12 and 14-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>rec'd 23 Jan 2006</u> . | 6) <input type="checkbox"/> Other: _____ |

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1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submissions filed on January 23, 2006 (amendment and IDS) have been entered.

2. Applicant's amendment received January 23, 2006 cancels claims 1, 2 and 13, and amends claims 3, 5, 7, 9, 11 and 14-18.

Claims 3-12 and 14-18 are pending.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. All rejections of claims 1, 2 and 13 are rendered moot by claim cancellation.

The rejections of claims 14-18 under 35 U.S.C. 112, first and second paragraphs, as set forth in the Office action mailed October 20, 2005 are overcome by applicant's amendment received January 23, 2006.

4. Claims 3, 4 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Brien et al. in *Appl. Phys. Lett.* Vol. 74, No. 3, pp. 442-444 or Baldo et al. in *Appl. Phys. Lett.*

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Vol. 75, No. 1, pp. 4-6, either reference in view of Salbeck et al. in *Synthetic Metals* 91, pp. 209-215.

O'Brien et al. disclose an organic electroluminescent device comprising a hole transport layer and an organic luminescent layer in which the hole transport layer is made of α -NPD and the luminescent layer is made of CBP as a host material and PTOEP as a phosphorescent dopant. The luminescent layer is capable of converting triplet excitation energy into light to be emitted. See the whole O'Brien article.

Baldo et al. disclose an organic electroluminescent device comprising a hole transport layer and an organic luminescent layer in which the hole transport layer is made of α -NPD and the luminescent layer is made of CBP as a host material and Ir(ppy)₃ as a phosphorescent dopant. The luminescent layer is capable of converting triplet excitation energy into light to be emitted. See the whole Baldo article.

Neither O'Brien et al. nor Baldo et al. disclose spiro-CBP (the host material required by claims 3, 4 and 14) or spiro-NPD (the material required for the hole transport layer of claims 3, 4 and 14).

Salbeck et al. teach that by using a spiro-linkage to modify low molecular organic compounds, processability and morphologic stability can be increased while retaining the electronic properties of the compounds (e.g. see the abstract). Given the teachings of Salbeck et al., it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize spiro-CBP in place of CBP in O'Brien's or Baldo's device, and to utilize spiro-NPD in

place of NPD in O'Brien's or Baldo's device, in order to increase the thermal stability of the devices. One of ordinary skill in the art at the time of the invention, having knowledge of the teachings of Salbeck et al., would have reasonably expected spiro-CBP and spiro-NPD to have the same electronic properties as CBP and NPD, respectively, while having better thermal stability than the non-spiro compounds. From Salbeck's teachings such as in the first paragraph of the introduction, and from knowledge in the art, one of ordinary skill in the art at the time of the invention would have recognized the value of using compounds of improved thermal stability in the manufacture of organic electroluminescent devices.

Regarding present claim 14, O'Brien et al. in view of Salbeck et al. render the claim unpatentable wherein the metal complex is PtOEP since O'Brien et al. disclose this metal complex as a phosphorescent dopant, and Baldo et al. in view of Salbeck et al. render the claim unpatentable wherein the metal complex is Ir(ppy)₃ since Baldo et al. disclose this metal complex as a phosphorescent dopant.

5. Claims 5-12 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Brien et al. in *Appl. Phys. Lett.* Vol. 74, No. 3, pp. 442-444 or Baldo et al. in *Appl. Phys. Lett.* Vol. 75, No. 1, pp. 4-6, either reference in view of Salbeck et al. in *Synthetic Metals* 91, pp. 209-215, as applied to claims 3, 4 and 14 above, and further in view of Grushin et al. (US 2002/0121638 A1).

The device structure and composition of claims 5-12 and 15-18 is similar to the device structure and composition of claims 3, 4 and 14, with claims 5-12 and 15-18 requiring a hole blocking layer not explicitly required by claims 3, 4 and 14.

Claims 5-12 and 15-18 require a hole transport layer comprising spiro-NPD, as required by claims 3, 4 and 14, and require a luminescent layer comprising spiro-CBP as a host material, as required by claims 3, 4 and 14.

Claims 5, 6 and 15 require a hole blocking layer comprising a triazole compound of specified formula.

Claims 7, 8 and 16 require a hole blocking layer comprising an oxadiazole compound of specified formula.

Claims 9, 10 and 17 require a hole blocking layer comprising a spiro-triazole compound of specified formula.

Claims 11, 12 and 18 require a hole blocking layer comprising a spiro-oxadiazole compound of specified formula.

The compounds required for the hole blocking layer of claims 5-12 and 15-18 are not disclosed in O'Brien et al. or Baldo et al. Instead, O'Brien et al. and Baldo et al. use 2,9-dimethyl,4-7,diphenyl-1,10-phenanthroline ("BCP") for the hole blocking layer (e.g. see the paragraph bridging pages 442 and 443 in the O'Brien article, and see the paragraph bridging pages 4 and 5 in the Baldo article).

Grushin et al. disclose a device comprising an emitting layer comprising an iridium compound that is capable of converting triplet excitation energy into light to be emitted, the

device further comprising an electron transporting layer which may be made of “TAZ”, which is the triazole compound required by present claim 5 and dependents, or “PBD”, which is the oxadiazole compound required by present claim 7 and dependents. Grushin et al. teach that “TAZ” or “PBD” may be used for the same purpose as 2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline (Grushin’s “DDPA”). “DDPA” as identified by Grushin et al. is the same as O’Brien’s or Baldo’s “BCP”.

It would have been a *prima facie* obvious modification to one of ordinary skill in the art at the time of the invention, having knowledge of Grushin’s disclosure that TAZ or PBD could be used for the same purpose as BCP, to substitute TAZ or PBD for BCP in O’Brien’s or Baldo’s device.

Further, having knowledge of the teachings of Salbeck et al. regarding the advantages of a spiro-linkage, one of ordinary skill in the art at the time of the invention would have been motivated to utilize spiro-TAZ or spiro-PBD in order to provide improved thermal stability while retaining the electronic properties of TAZ or PBD.

6. Applicant’s arguments filed January 23, 2006 have been fully considered but they are not persuasive.

Due to amendments made to claims 5, 7, 9 and 11, claims 5-12 and 15-18 are now rejected under a different combination of references, but all references relied upon in the new rejection are discussed in applicant’s arguments. Applicant’s arguments as would be applicable to this new combination of references have been taken into consideration.

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Applicant argues that none of the applied references disclose a spiro-linkage for a host material in an organic luminescent layer. While the prior art does not explicitly disclose a spiro-linked host material for a luminescent layer, it is the examiner's position that one of ordinary skill in the art at the time of the invention would have recognized the benefits of spiro-linked materials in general and, based on Salbeck's teachings of the advantages of spiro-CBP over CBP (the host material of O'Brien's and Baldo's devices), would have been motivated to use spiro-CBP in place of CBP.

7. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY
April 29, 2006



MARIE YAMNITZKY
PRIMARY EXAMINER

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